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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/857,540	07/23/2001	Sugio Miyazawa	939 026	6358

25191 7590 05/13/2003

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EXAMINER	
DONG, DALEI	

ART UNIT	PAPER NUMBER
2875	

DATE MAILED: 05/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/857,540	MIYAZAWA ET AL.	
	Examiner	Art Unit	
	Dalei Dong	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 July 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) *4* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 July 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. *09/857,540* .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

1. Claim 4 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected a method of fabricating a discharge vessel or chamber, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 09,857,540. The criteria for establishment of restriction is if it can be shown that the product can be made by entirely different method as claimed by applicant.

Because the method of making and the product of a discharge vessel or chamber for high-intensity discharge lamp are distinct invention as acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Drawings

2. Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,126,889 to Scott in view of U.S. Patent No. 5,683,949 to Scott.

Regarding to claims 1-3, Scott '889 discloses in Figure 1, "a ceramic metal halide (CMH) lamp assembly 10 according to the present invention. It is noted that both ends of the lamp assembly 10 are identical or substantially similar, therefore, only one end of the lamp assembly 10 is shown and described herein in detail. The lamp assembly 10 includes a high-pressure envelope or arc tube 12 which is transparent, end bushings or caps 14 sealing the open ends of the arc tube 12, and electrode assemblies 16 extending through and supported by the end caps 14 to form an arc within the sealed arc tube 12 when electrical current is applied to the electrode assemblies 16" (column 2, line 21-31).

Scott '889 also discloses in Figure 1, "the transparent arc tube 12 is formed from sapphire (single crystal alumina) which is fully dense. The arc tube can be produced in any suitable manner. See, for example, U.S. Pat. Nos. 5,427,051, 5,451,553, 5,487,353, 5,588,992, and 5,683,949, for suitable methods of producing sapphire arc tubes, the disclosures of which are expressly incorporated herein in their entirety by reference" (column 2, line 32-38).

Scott '889 further discloses in Figure 1, "the end caps 14 are formed from a suitable polycrystalline ceramic material, preferably polycrystalline alumina, which is in an unsintered or "green state". The end caps 14 most preferably include about 0.02 to about 0.2 percent by weight MgO with polycrystalline alumina powder" (column 2, line 43-47).

Scott '889 further yet disclseos in Fgirue 1, "each end cap 14 has a disc-shaped main wall 22, a cylindrically-shaped skirt or flange 24, and a tubularly-shaped extension 26 (capillary). The main wall 22 has a planar inner surface 28 facing the end surface of the arc tube 12 and a planar outer surface 30 facing away from the end surface of the arc tube 12" (column 2, line 55-61).

Scott '889 further yet discloses in Figure 1, "the flange 24 axially extends inward toward the arc tube 12 from the outer periphery of the main wall 22. The main wall 22 and flange 24 cooperate to form a cup or socket for receiving the end portion of the arc tube 12 therein. The flange 24 has a cylindrically-shaped inner surface 32 which has a diameter sized to form a sufficient monolithic seal with the outer surface 18 of the arc tube 12 as discussed in more detail hereinbelow. The length of the flange inner surface 32 is sized to provide a sufficient sealing area between the end cap 14 and the arc tube 12 as discussed in more detail hereinbelow" (column 2, line 62 to column 3, line 5).

Scott '889 further yet discloses in Figure 1, "the extension 26 axially extends outward from the outer surface 30 of the main wall 22 and is located generally at the center of the main wall 22. The extension 26 and the main wall 22 cooperate to form an axially extending aperture or hole 34 which passes entirely through the end cap 14. The

aperture 34 is sized and shaped to form a sufficient hermetic seal between the electrode assembly 16 and the end cap 14 as discussed in more detail hereinafter. Preferably, the aperture 34 is cylindrically-shaped. The length of the extension 26 is sized to provide sufficient support for the electrode assembly 16 and to provide a sufficient sealing area between the end cap 14 and the electrode assembly 16" (column 3, line 6-17).

However, Scott '899 does not disclose center body contain magnesium oxide 1.5 times less than capillary. Scott '949 teaches A starting material which has been found useful in the practice of this invention, wherein the polycrystalline body comprises polycrystalline alumina (PCA) and the PCA body is converted to single crystal alumina (hereinafter sapphire), is a bisque-fired body of relatively pure alpha alumina having an interconnected pore structure. An interconnected pore structure facilitates uniform penetration of the doping solution throughout the bisque-fired body. The typical starting bisque-fired material has a pore volume ranging from about 15-70%. In general, the starting material is a bisque-fired body composed of 99.9% alumina which can be sintered to densities greater than 3.90 g/cc after doping and is free of impurities of a type and amount that would prevent the conversion of the sintered PCA body to sapphire. When sintered, the bisque-fired body typically produces a PCA material having an equiaxed grain structure with average grain sizes less than 100 microns and preferably less than 70 microns. By grain size is meant the average dimension of a grain as measured by the well known linear intercept technique described in ASTM E112-88. PCA materials with average grain sizes larger than 100 microns tend to form microcracks during the heat treatment of this invention which prevents the conversion to sapphire.

The density of the sintered PCA should be at least 3.90 g/cc and more typically greater than 3.97 g/cc as the residual porosity can impede the conversion to sapphire and/or yield a sapphire product having less than optimal light transmittance" (column 4, line 58 to column 5, line 17).

Scott '949 also teaches in "in the production of sapphire in accordance with this invention, the starting bisque-fired material was bisque-fired alumina tubes used for the manufacture of Lucalox.RTM. tubes which have outer diameters ranging from 4.5 mm to 8.8 mm and wall thicknesses ranging from 0.5 mm to 0.75 min. This bisque-fired material is available from General Electric Company, Willoughby Quartz and Ceramic Plant, Willoughby, Ohio (Product #LT5.5-36-PS; Resource #258 23 61). This bisque-fired material typically has a pore volume of 50-60%. When sintered, this material produces a PCA body having densities ranging from 3.97 g/cc to 3.98 g/cc and an equiaxed grain structure with average grain sizes ranging from 15-70 microns. A typical trace impurity analysis for the sintered material (undoped) is given in Table 1 below. The 180 wppm concentration of Magnesium (Mg) is equivalent to about 300 wppm magnesium oxide (MgO)" (column 5, line 18-33).

Scott '949 further teaches "magnesium oxide, typically added to alumina as a sintering aid to obtain a PCA body of densities greater than 3.97 g/cc, has been found to prevent the conversion of PCA to sapphire if present in sufficient quantity. Thus, steps must be taken to lower the magnesium oxide content of the fully dense doped PCA body prior to conversion to sapphire. The level to which magnesium oxide must be lowered can depend on the type and amount of the dopant added. In some cases it has been found

that it is necessary to reduce the magnesium content to as low as 50 wppm prior to converting the material to sapphire. Magnesium oxide content was determined using Inductively Coupled Plasma (ICP) analysis. Those skilled in the art know that magnesium oxide can be driven out of a PCA body by heating the body in a vacuum, dry hydrogen, or inert gas containing atmosphere to temperatures above 1600.degree. C. In the process of this invention, this was accomplished by heating the doped Lucalox.RTM. brand PCA in an electric resistance furnace to temperatures of 1880.degree. C. for approximately one to nine hours, depending on the part size, dopant type, and dopant level, in an atmosphere of dry hydrogen having a dew point below 0.degree. C. Times required to drive magnesium oxide from an alumina body will vary based on starting magnesium oxide content, furnace temperature, furnace atmosphere, and part dimension. Care must be taken during the magnesium oxide volatilization to avoid heating the material for too long as this can result in average grain sizes greater than 100. mu.m and/or anomalous grain growth" (column 5, line 43 to column 6, line 3).

Scott '949 further yet teaches "in accordance with this invention, the bisque-fired starting material is doped to a selected concentration with a conversion-enhancing dopant. As used herein, "conversion-enhancing dopant" refers to a dopant that, when introduced into the polycrystalline material at a concentration as described herein, reduces the time necessary to effect the solid state conversion of the polycrystalline material to a single crystal material during the heating process as discussed below. The selected concentration of the dopant is less than the solid solubility level of the dopant in the polycrystalline material. The selected concentration of conversion-enhancing dopant

thus is less than a concentration that will result in the formation of a second crystalline phase in the polycrystalline material. In doping the polycrystalline material, the dopant is typically dispersed in the polycrystalline material such that the concentration of the dopant is substantially homogeneous throughout the polycrystalline material. Based on dopant levels that have been investigated to date, it has been observed that conversion rate (from PCA to sapphire) generally increases as the concentration of the dopant is increased" (column 6, line 4-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilize the sapphire tube body doped with minimal amount of MgO of Scott '949 for the ceramic metal halide lamp assembly of Scott '889 in order to provide a transparent discharge arc tube and maintains the structural integrity of the tube and thus prolong the lifetime of the lamp assembly.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a discharge vessel or chamber for a high-intensity discharge lamp.

U.S. Patent No. 5,424,609 to Geven.

U.S. Patent No. 6,004,503 to Neil

U.S. Patent No. 6,020,685 to Wei.

U.S. Patent No. 6,259,205 to Wijenberg.

U.S. Patent No. 6,392,345 to Niimi.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.
May 7, 2003

Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800